DOCUMENT RESUME

ED 139 632 SE 022 359

AUTHOR Okey, James R.; Yeany, Russell H., Jr.
TITLE The Relationships Among Science Educators' Research Priorities and Demographic Variables.
PUB DATE Mar 77
NOTE 14p.; Paper presented at the annual meeting of the National Association for Research in Science Teaching (50th, Cincinnati, Ohio, March 22-24, 1977); Not available in hard copy due to marginal legibility of original document

EDRS PRICE MF-$0.83 Plus Postage. HC Not Available from EDRS.
DESCRIPTORS *Demography; Educational Research; *Higher Education; *Research Needs; *Science Education; Science Teachers; Surveys; *Teacher Attitudes; *Teacher Characteristics
IDENTIFIERS National Assn of Research in Science Teaching; Research Reports

ABSTRACT

Examined were relationships among demographic information provided by members of the National Association of Research in Science Teaching (NARST) and their ratings of priorities for science education research. Correlations are provided for the following: (1) between the amount of formal training of respondents and their research productivity; (2) between the amount of budgeted research time and the research productivity of the respondents; (3) between the research productivity of respondents and their ranking of research statements; and (4) between the ranking of importance of research by respondents and their ranking of research statements. (Author/MH)

****
* Documents acquired by ERIC include many informal unpublished *
* materials not available from other sources. ERIC makes every effort *
* to obtain the best copy available. Nevertheless, items of marginal *
* reproducibility are often encountered and this affects the quality *
* of the microfiche and hardcopy reproductions ERIC makes available *
* via the ERIC Document Reproduction Service (EDRS). EDRS is not *
* responsible for the quality of the original document. Reproductions *
* supplied by EDRS are the best that can be made from the original. *
****

ED139632

U.S. DEPARTMENT OF HEALTH,
EDUCATION & WELFARE
NATIONAL INSTITUTE OF
EDUCATION

THIS DOCUMENT HAS BEEN REPRODUCED EXACTLY AS RECEIVED FROM THE PERSON OR ORGANIZATION ORIGINATING IT. POINTS OF VIEW OR OPINIONS STATED DO NOT NECESSARILY REPRESENT OFFICIAL NATIONAL INSTITUTE OF EDUCATION POSITION OR POLICY

THE RELATIONSHIPS AMONG SCIENCE EDUCATORS' RESEARCH PRIORITIES AND DEMOGRAPHIC VARIABLES

James R. Okey and Russell H. Yeany Jr.
Department of Science Education
University of Georgia
Athens, Georgia

A Paper Presented at the Annual Meeting of the
National Association for Research in Science Teaching

Cincinnati, Ohio
March 23, 1977

SE 022 359

THE RELATIONSHIPS AMONG SCIENCE EDUCATORS' RESEARCH PRIORITIES AND DEMOGRAPHIC VARIABLES[1]

At the request of the Research Committee of the National Association for Research in Science Teaching (NARST), a study[2] was conducted to determine the priorities for research among science educators. In a mail survey, the 780 members of NARST were asked to nominate, "needed areas of research in science education." The nominations from NARST members were classified into 35 generic research statements. In a second phase of the study, the statements were mailed back to all NARST members who were asked to rate each statement on a 1 (high) to 10 (low) priority scale. NARST members were also asked to complete a demographic questionnaire that included such items as the amount of research training they had, their research productivity, and the type and size of their institutions. In a third phase of the study, all respondents from the second phase were provided with summary statistics (central tendency and dispersion data) from the initail rating of the 35 research statements and asked to rerank them in light of the collective response of the members. A complete description of the procedures followed in this study of research priorities can be found in a report by Butts, et. al. (1977).

The purpose of this paper is to analyze data from the NARST research priority study to identify relationships among the selected demographic variables covered by the questionnaire and the priority ratings given to the research statements. The analysis will allow a determination of possible links between such variables as the amount of research training and research productivity,

---

[1] A paper presented at the Annual Meeting of the National Association for Research in Science Teaching, Cincinnati, Ohio, March, 1977.

[2] The study was conducted at the University of Georgia. Participants included David Butts, William Capie, Ellen Fuller, David May, James Okey and Russell Yeany.

between institution size and proportion of time spent on research, or between the importance attached to basic or applied research and the rating of the research statements. The information that can be obtained has value in a variety of ways such as planning graduate programs, predicting the productivity of researchers with various assignments, or determining the degree to which persons with different training agree on the research work important in their field. Perhaps most important though, is the fact that the data say something about members of the NARST organization--the relationships among what their jobs are, the type and amount of research work they complete, and what they think are important research tasks that need attention.

PROCEDURES AND OUTCOMES

Sample

An up-to-date NARST membership list (April, 1976) was used to select participants for this survey study.[3] Of the 780 NARST members receiving the initial mailing, a total of 327 (42%) completed the second phase. A total of 209 members (64% of the phase II respondents and 27% of those in the original list) completed the third phase of the study. It was decided that the demographic data provided in phase II and the rating of the research statements from phase III would provide the data from which the correlations for this study would be produced. Phase III research ratings were used because they represented the final decisions of the respondents. This led to a total of 198 usable responses (95% of the persons completing phase III of the study and 25% of the NARST members) for generating the data for this study.

[3]Because the study was to be completed in a short time, only U. S. and Canadian members of NARST were surveyed.

Demographic Data

The demographic information provided by NARST members consisted of responses to a 20-item questionnaire. Table 1 gives a brief description of the items on the questionnaire and a short summary of the data provided for each variable. In Table 2 the correlation matrix for the 20 demographic variables is given.

Ranking of Research Statements

A complete listing of the 35 generic research statements that were rated by the NARST members is available elsewhere (Butts, et.al., 1977). Table 3 shows the ten statements from that list that received the highest research priority in the survey and the five that received the lowest priority. Table 4 provides the correlations of the 20 demographic variables with these 15 statements.

SUMMARY[9]

Demographic Data

A summary of the information provided by the 198 respondents is as follows:

- about 75% have completed 3 or more research classes
- about 50% have 6 or more years of experience
- about 60% have no time budgeted for research
- about 10% have more than 1/4 of their time for research
- about 30% have no published research articles or papers
- about 50% have none or 1 research article published in the last 5 years
- about 13% averaged 1 published research article per year over the last 5 years, the remainder published less than this
- about 40% have some instructional responsibilities for research design courses

[9]It is important to keep in mind that this summary is based on information from 198 of the 780 members on the NARST mailing list. It is not known how accurately these results reflect the background and views of the 582 members not included here.

TABLE 1

Demographic Data From NARST Members (n=198)

VARIABLE	DESCRIPTION	INFORMATION
1	Amount of research training	2% had no training, 19% had 1 or 2 courses, 79% had 3 or more
2	Amount of research experience	18% had 2 years or less, 25% from 3 to 6, 56% had 6 or more
3	Type of institution	87% teach in public institutions
4	Enrollment of institution	32% are less than 10,000; 41% are more than 20,000
5	% of job: undergraduate science teaching	70% have none, average of 45% for the others
6	% of job: undergraduate teacher training	42% have none, average of 46% for the others
7	% of job: graduate science education	44% have none, average of 30% for the others
8	% of job: research	62% have none, average of 25% for the others
9	% of job: administration	59% have none, average of 30% for the others
10	research studies completed past 5 years	31% have 0 or 1, 40% have 2 to 5, 28% have 5 or more, overall mean of 2.1
11	research papers given past 5 years	41% have 0 or 1, 43% have 2 to 5, 16% have 5 or more, overall mean of 1.8
12	research articles published past 5 years	49% have 0 or 1, 37% have 2 to 5, 13% have 5 or more, overall mean of 1.7
13	# of career research studies	mean response is 8.2, mode is 1, 12% have none
14	# of career research papers	mean is 7.6, mode is 2, 25% have none
15	# of career research articles	mean is 7.8, mode is 2, 30% have none
16	portion of time budgeted for research	62% have no time, 27% have 25% or less, 11% have 26% or more
17	importance of applied research	mean rank of 2.1 on 1 (high) to 4 (low) scale, highest rank of items 17-20
18	importance of dissemination	mean rank of 2.7
19	importance of development	mean rank of 2.3
20	importance of basic research	mean rank of 2.9, lowest rank on items 17-20

TABLE 2

Correlation Matrix[4] For Demographic Variables[5]

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
1	--	-.12	-.05	.18	.07	-.18	-.08	.72	-.02	.15[a]	.18[a]	.08	.13	.18	.08	.18[a]	-.11	.13	.11	-.11
2		--	-.07	.31	-.38[a]	-.26[a]	.06	-.19	-.03	.18[a]	.14	.17[a]	.09	.05	.07	.05	-.08	.08	-.13	.03
3			--	-.19[a]	.07	-.15	.25[a]	.25[a]	-.18[a]	-.04	-.07	-.10	.20[a]	-.08	-.01	.05	.09	-.17	.06	.02
4				--	-.02	-.11	.15	.13	.06	.77[a]	.19[a]	.21[a]	.22[a]	.24[a]	.23[a]	.20[a]	-.04	.08	.07	-.01
5					--	-.08	.17	-.02	-.24	-.18	-.14	.01	-.33[a]	-.24	-.11	-.03	-.16	-.18	.14	.07
6						--	-.20[a]	-.10	-.17[a]	-.26[a]	-.15	-.25[a]	-.34[a]	-.18	-.18	-.27	.13	-.06	-.04	.03
7							--	.30[a]	-.02	.04	.06	.07	.01	-.02	.14	.01	-.17	.08	.07	-.01
8								--	.01	.20[a]	.24[a]	.19	.34[a]	-.03	.15	.89[a]	-.28[a]	.27	.21	-.25[a]
9									--	-.05	-.12	-.10	-.13	-.12	-.04	-.10	.01	.10	-.23	.09
10										--	.81[a]	.58[a]	.41[a]	.28[a]	.37[a]	.34[a]	-.32[a]	.24[a]	.04	-.06
11											--	.58[a]	.26[a]	.46[a]	.40[a]	.22[a]	-.15[a]	.25[a]	.01	-.11
12												--	.30[a]	.20[a]	.30[a]	.30[a]	-.24[a]	.22[a]	.05	-.08
13													--	.45[a]	.46[a]	.30[a]	-.07	.01	.12	.03
14														--	.74[a]	.81	.05	.06	.03	.01
15															--	.02	.07	.06	.07	.03
16																--	-.23[a]	.09	.06	-.03
17																	--	-.36[a]	-.21[a]	-.17[a]
18																		--	-.17[a]	-.48[a]
19																			--	-.53[a]
20																				--

[a] $p < .05$

[b] For this Table and Table 4 different numbers of cases were used in calculating the coefficients. As a result, the same coefficient may or may not reach the selected significance level.

[c] See Table 1 for a description of each numbered variable.

TABLE 3

Research Statements Receiving The Highest And Lowest Ratings

Rank order	Mean rating on 1-10 scale[6]	Research Statement
1	2.5	Application of learning and cognitive development theories to classroom instruction.
2	2.5	Analysis of classroom teaching behaviors that facilitate science learning.
3	2.7	Identify what elements are essential in translating both research and development activities into classroom practice.
4	2.7	Analysis of strategies for acquisition, retention and transfer of problem solving (critical thinking or inquiry skills) in students.
5	2.9	Identification and validation of strategies to assist pre-service and inservice teachers in acquiring specific teaching skills.
6	3.0	Relationship between motivation, attitudes and performance (in both students and teachers).
7	3.0	Identification and development of teacher education strategies (inservice and preservice) designed to facilitate professional growth and concerns of teachers, including commitment to continued growth.
8	3.1	Identification and validation of teaching behaviors and instructional strategies that facilitate student self-concept, knowledge and attitudes.
9	3.2	Identification and validation of specific learner characteristics which relate to successful achievement in science.
10	3.2	Definition and validation of goals of science instruction, e.g., balance between process and process objectives, philosophical and theoretical basis of science instruction, articulation of goals for students at all levels, K-16.
31	5.6	Influence of political and technological pressures on science instruction, science teacher needs manpower--e.g., public attitudes and science enrollments.
32	5.6	Identification of management skills needed for maintaining a viable learning classroom environment--e.g., discipline, grouping, bookkeeping skills.
33	5.8	Description of current perceptions of middle school, high school and college graduates about the nature of life, matter and energy, about usefulness and desirability of alternative teaching modes and strategies.
34	8.7	Analysis of factors which characterize the reluctant science teacher.
35	8.1	Comparison of goals of science teaching today with those of 10-20 years ago as viewed by a variety of society's segments--e.g., parents, teachers, students, and teacher educators.

[6] Ratings have been rounded to the nearest tenth.

TABLE 4

Correlations of Demographic Variables with Research Statements of Highest and Lowest Priority Ranking[7]

Demographic Variables[8]	1	2	3	4	5	6	7	8	9	10	31	32	33	34	35
1	-.08	-.02	-.06	-.07	-.01	.07	.16*	.02	-.10	.05	.09	-.02	.02	.05	.12
2	.01	.01	.08	.06	-.01	.15*	.01	.13	.04	.09	-.07	.05	-.06	-.05	-.18*
3	.04	.01	.04	.12	.14*	.11	.11	.03	.09	-.07	.01	.06	-.07	.15*	.01
4	.02	.06	.14	.01	.05	.09	-.03	-.04	.05	.13	-.01	-.15	-.01	.01	-.08
5	-.13	.07	-.02	-.20	.13	-.28*	.25*	.04	-.13	-.10	-.32*	-.07	.01	.11	.04
6	-.02	-.14	-.17	-.01	-.19*	-.11	-.21*	-.04	-.09	-.23*	-.07	-.12	-.01	-.05	-.02
7	.05	.08	-.07	.09	.05	.01	-.05	-.26*	.14	-.15	-.23*	.10	-.13	.03	-.02
8	.26*	.20	.14	.37*	.43*	.37*	.55*	.29*	.12	-.07	.12	-.01	.17	.23*	-.03
9	.05	-.17	-.09	.23*	-.07	-.07	-.12	-.07	-.03	.01	-.23*	-.13	-.12	-.04	-.08
10	.01	-.02	.01	.06	.04	.04	.10	.08	.06	.12	.04	.05	.02	-.05	-.01
11	-.06	-.01	.03	.05	-.06	.08	.06	.08	.10	.08	-.01	.12	-.02	.02	-.01
12	-.03	.04	.01	-.11	.05	.17*	.07	.14	-.04	.10	-.02	.09	.05	.01	-.08
13	.18*	.10	.11	.19*	.28*	.05	.24*	.18*	.08	.18*	.02	.02	.05	.07	-.05
14	-.01	-.02	.04	.08	.05	-.02	.03	.02	-.03	.24*	-.05	-.10	-.02	-.01	-.01
15	.08	.05	.09	.20*	.15	-.01	.12	.05	-.09	.27*	-.16	-.01	.05	-.04	-.07
16	.05	.12	.09	.12	.24*	.24*	.24*	.13	.10	.05	.14*	.11	.12	.17*	.02
17	-.01	.02	-.01	-.03	-.01	.06	-.10	-.09	-.05	-.03	.05	.03	-.13	-.01	.06
18	-.03	.02	-.01	.04	.07	.03	.09	.07	.06	.05	.01	-.01	.04	.06	-.08
19	-.03	-.08	.12	-.11	.10	-.01	.13	.10	-.10	-.05	.02	.08	.16*	.05	.04
20	.07	.05	-.06	.10	-.09	-.08	-.08	-.07	.08	.05	-.05	-.10	-.07	-.13	-.02

*$p<.05$

[7] See Table 3 for a listing of the top ten and bottom five research statements.

[8] See Table 1 for a description of each numbered variable.

Correlations Among Demographic Variables

A total of 65 significant ($p<.05$) correlation coefficients are shown in Table 2. Among the findings of interest are:

- The number of research studies (#10), research papers (#11), and research articles (#12) completed in the past 5 years correlated significantly with 13, 11, and 11 other demographic variables, respectively. This is the largest block of significant correlations on the chart.

- The portion of time budgeted for research (#16) correlated significantly with 9 other variables. These range from a negative correlation with the importance of applied research (#17) to a high positive correlation with the portion of time devoted to teaching research classes (#8). Significant positive correlations were found with each of the three measures of recent productivity (#10, 11, 12).

- The portion of time devoted to undergraduate teacher training (#6) correlated significantly with 7 other variables and each was negative. This included two of the three measures (#10, 12) of recent research productivity.

- The amount of research training (#1) correlated significantly with recent research productivity (#10, 11) and with the amount of time budgeted for research (#16).

- The enrollment of the institution at which one works (#4) has a significant relationship with 8 other variables including positive correlations with the 6 measures of recent (#10, 11, 12) and career (#13, 14, 15) productivity.

Ranking of Research Statements

The research statements receiving the highest and lowest priority rankings (see Table 3) deal with a variety of research topics.

- 5 of the top ten statements describe research associated with teaching behaviors or teaching strategies. Three of these are concerned with identifying teaching skills that influence student learning (#2, 4, 8), the other two are concerned with effective means of teacher education (#5, 7).

- 2 of the top statements (#1, 3) describe studies that involve applying theory and research to classroom practice.

- 2 of the top statements (#6, 9) describe studies that would seek relationships among teacher and student variables (e.g., attitudes, motivation, and performance).

- the five research statements with the lowest ratings each deal with a status survey calling for a descriptive, analytical, or comparative study.

Another report (Yeany and Capie, 1977) examines the relationships among the ratings of the research statements in greater detail using factor analysis procedures.

Correlations of Demographic Variables and Research Ratings

A total of 38 significant correlations ($p<.05$) are shown in Table 4 among the 300 correlations calculated.

- the percentage or one's job devoted to teaching research classes (#8 in Table 1) and the portion of time budgeted for research (#16) account for 7 and 5 of the significant correlations, respectively. Each of these is a positive correlation which means that NARST members with the most research teaching and time tended to give the statements a lower priority than persons with low research responsibilities.

- the number of career research studies (#13) correlated (significantly) with the rating of 6 of the research statements. Again each correlation is positive indicating that persons with high productivity tended to give the statement a low priority rating.

- The highest correlations in Table 4 are for the relationship between the percentage of one's job devoted to teaching research classes (#8) and the ratings of statements #5 (.43) and #7 (.55). These are the two statements that deal with effective means of teacher education.

- The three measures of recent research productivity (#10, 11, 12) yield only 1 significant correlation with the rating of the top ten or bottom five research statements.

CONCLUSIONS

Despite the fact that NARST members belong to a research association, they appear as a group for whom research is not a major activity. A full 60%

of the NARST respondents have no budgeted research time and only one-fourth of the remaining 40% have as much as 25% time for research. Over the last five years they averaged about .35 research articles per year or an average of 1 published research article every three years.

The significant correlations among the demographic variables are all of moderate to low magnitude. The highest correlations in the matrix are for the intercorrelations among the several measures of recent and career research productivity (e.g., .74, .61, .58) as would be expected. The remaining correlations hover around the .20 to .30 range, hardly a size on which to base predictions.

The research statements receiving the highest rankings of NARST members emphasize the acquisition and influence of teaching strategies or behaviors, applying theory and research to classroom practice, and relationships among teacher and student variables. Research statements with the lowest rankings tend to emphasize survey research studies.

The relatively few significant correlations between the demographic variables and the ratings of the research statements indicate the broad based support for those activities with the highest research priority. A large number of either high positive or high negative correlations would have indicated a polarity among NARST members associated with such factors as amount of training, measures of productivity, or years of experience. This was not found. Instead there were few significant correlations and these were of only moderate magnitude.

Positive correlations predominate among those which are statistically significant in Table 4 (demographic variables with ratings of research statements). This means that there is some difference in the priorities for research among NARST members based on their time devoted to teaching and conducting

research. Positive correlations mean that persons with small amounts of time for teaching and conducting research tended to give the statements lower ratings (higher priority) and vice versa. Both the small number of significant correlations and their relatively small magnitude make this an important but not overwhelming conclusion.

REFERENCES

Butts, D., Capie, W., Fuller, E., May, D., Okey, J., and Yeany, R. Priorities for research in science education. Paper presented at the National Association for Research in Science Teaching Annual Meeting, Cincinnati, Ohio, March, 1977.

Yeany, R. and Capie, W. A factor analytical study of the research priorities of science educators. Paper presented at the National Association for Research in Science Teaching Annual Meeting, Cincinnati, Ohio, March, 1977.